

## REMARKS

Claims 1, 2, 4, 6-13, 15, 16, 18, 20, 22 and 23 are pending. The claims have been amended to recite in claim 1 that vanadium is not added to said alloy, and in claim 11 to recite that nickel is not added to said alloy. Support for the instant amendments can be found throughout the specification and claims as originally filed, for example on page 3 of the original specification. No new matter has been entered. Entry of the amendment and favorable reconsideration are earnestly solicited.

### Claim Rejections – 35 U.S.C. §103(a)

On page 2 of the Action, claims 1-2, 4, 6-13, 15, 16, 18, 20, 22 and 23 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over SU 348633A(SU'633). On page 4 of the Action, claims 1-2, 4, 6-13, 15, 16, 18, 20, 22 and 23 stand variously rejected under 35 USC 103(a) over Dulin (US 2,821,495a). Applicant respectfully requests reconsideration and withdrawal of these rejections.

1. There is no *prima facie* case of obviousness presented viz the instant claims in view of the references being relied upon.

It is respectfully submitted that the instant rejections are no longer tenable in view of the instantly amended claims as well as the concurrently filed Declaration of Mr. Michel Garat which is attached hereto [“Garat Feb. '09 Declaration”]. Namely, all the claims now specifically require that no vanadium is added thereto. Claim 11 requires that no nickel is added thereto. As mentioned previously in prior responses to the PTO, SU '633 requires the conscious addition of vanadium as well as other elements such as misch metals which are simply not contemplated by the instant claims. See Garat Feb. '09 Declaration, ¶¶ 5-9. In these paragraphs, Mr. Garat points out very specific reasons about the deficiencies which would be caused by the addition of vanadium and misch metals in the content envisioned by SU '633. Based on the opinion of Mr. Garat, there is simply no basis to contend that a *prima facie* case of obviousness exists regarding SU '633.

As to Dulin, there is simply no teaching or suggestion to utilized the claimed amount of Zr, namely, from 0.05-0.25% in Dulin. That is, as confirmed by Mr. Garat in ¶12 of his

Declaration, Dulin mentions Zr as an option among numerous other elements (Ti, Zr, Mn, Ni, Cr, B, Be) with a 0.01 – 1.0% content which is absolutely unrealistic. At 0.01%, Zr would have no beneficial effect on creep. At 1.0%, Zr (which is four times more than the upper limit in the alloy of the present application) would make the alloy completely brittle, and furthermore the holding temperature of the melt would have to be above 875°C which is not industrially practical. As explained supra, the optimal casting temperature of cylinder heads is of the order of 700 – 720°C. Indeed, Mr. Garat points out in ¶12 that even levels of 0.30% Zr and above are excessive and have been shown to cause the presence of coarse AlZrSi platelets which make the alloy brittle. As such, as proven by Mr. Garat's opinion as one of skill in the art, there would have been no motivation to have selected the claimed range of Zr from the disclosure of Dulin.

2. Applicants have demonstrated unexpected results that are commensurate in scope with the present claims and Applicants have shown criticality with respect to the unexpected results

Mr. Garat, in his Feb. '09 Declaration states that following,

"I confirm that as one of skill in the art, it is my opinion that the unexpected results detailed in the tested examples described in the prior declaration to be relevant across the entire scope of the claimed alloying range; that is, for Si 5-11, Fe at most up to 0.3, Mg 0.25-0.5, Cu 0.3-1.5, Ti 0.05-0.25, Zr 0.05-0.25, Mn <0.4, Zn <0.3, Ni <0.4, other <0.10 each, <0.30 total, remainder aluminum. I have this opinion because the Zirconium addition of from 0.05-0.25% improves the creep resistance by forming very fine AlZr(Ti)Si phases (of the order of 0.3  $\mu$ m) during the solution treatment generally at between 500 and 540°C. It is my experience that only the Si in solid solution in the aluminum dendrites (about 1.5% independently from the total amount of 5 to 11%) can combine with Zr and Al to form these phases and the silicon in excess (5 to 11% minus 1.5%) is in the form of comparatively coarse eutectic crystals (about 10  $\mu$ m) which do not interact with Zr. The other elements Fe, Cu, Mg, Zn, Ni, Mn do not play any part in the AlZr(Ti)Si phases and therefore, the recited ranges would be expected to also display the unexpected results across those ranges recited in claim 1. Ti partly combines with Al, Zr and Si, and is favorable to creep resistance and the range of 0.05-0.25% Ti is what would be expected to work best in this case. "

As such, since there have been unexpected results shown, and those results are

commensurate in scope with the present claims and display criticality, even if there were a *prima facie* case of obviousness, such a point would be moot in view of the unexpected results already of record in this matter.

For all these reasons, it is respectfully submitted that the instant rejections are improper and should be withdrawn. The Examiner is respectfully requested to reconsider and withdraw the outstanding rejections based on SU '633 and Dulin.

## **CONCLUSION**

In view of the foregoing remarks, Applicant respectfully asserts that the rejections as set forth in the Office Action of November 21, 2008 have been addressed and overcome. Applicant further respectfully asserts that all claims are in condition for allowance and requests that a Notice of Allowance be issued. If issues may be resolved through Examiner's Amendment, or clarified in any manner, a call to the undersigned attorney at (202) 508-3450 is courteously solicited.

The Commissioner is hereby authorized to charge deposit account 50-4254 for any deficiency of fees or credit .any overpayments.

Respectfully submitted,

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